

Evolution of Future Aircraft Data Communication

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Introduction

Current Communication Architecture

- Overview
- Example: A340 500/600
- Services Evolution

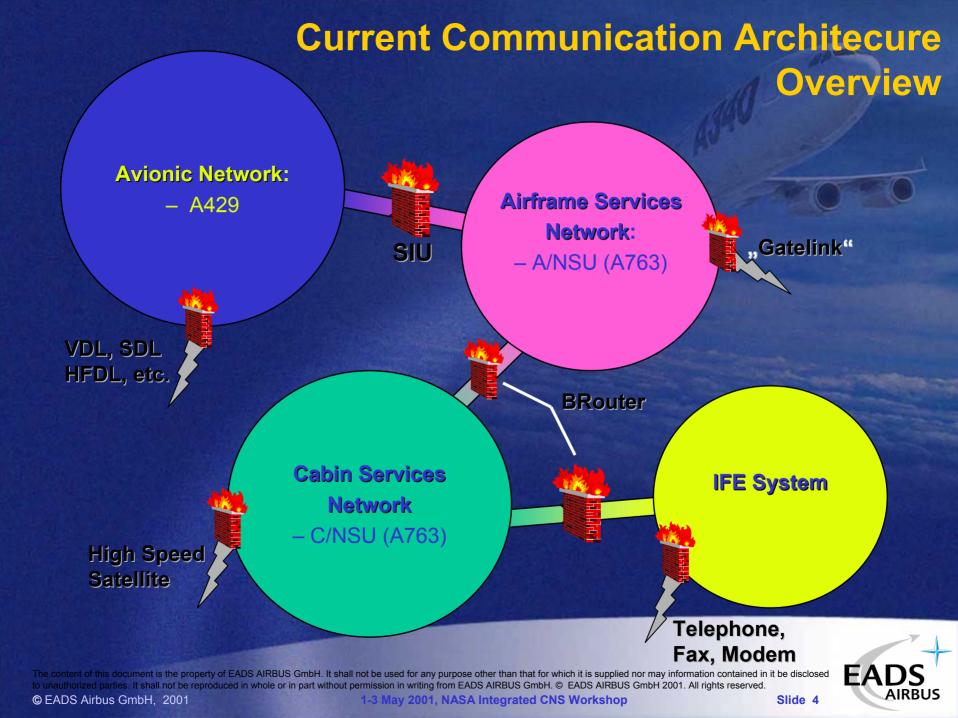
Future Communication Architecture

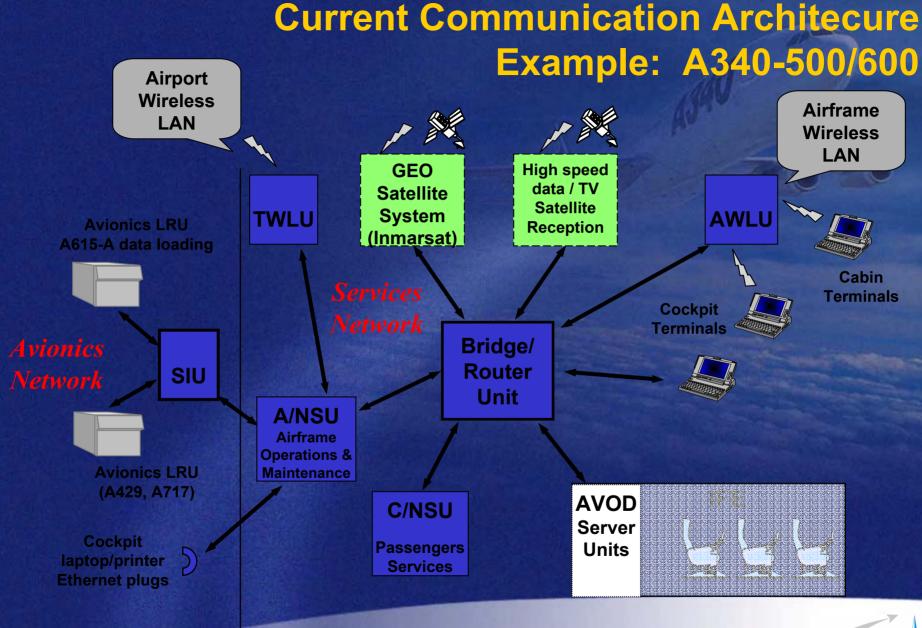
- Overview
- Example: A380
- Additional Services

Communication Technologies

- Overview
- Research Needs







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Current Communication Architecure Services Evolution

- · E-mail (limited)
- Intranet
- News (text)

- Email (full connectivity) to corporate network)
- GSM accountability

- Live TV
- Internet access
- E commerce
- Personnel mobile phone
- Digital Logbook
- MCDU Emulation
- Configuration management
- Systems Performance monitoring
- CMS/ACMS data correlation
- Cabin Logbook
- IFE content upload
- Airline information
- E commerce

PASSENGERS

CAATS / ADRESS Maintenance tools (AIRMAN)

- link PFR -> TSM
- PFR viewer
- active PFR filtering

Credit Card verification

High speed data loading

FMS nav data base upload

CIDS help functions

FOQA download

MAINTENANCE CREW

Crew E-mail E Documentation Cabin services

CABIN CREW

- Crew E-mail
- E documentation (FCOM, MEL)
- · OPS applications (flight plan, take-off, loading)

 Other OPS applications (airline info, in flight, landing, weather, maps)

COCKPIT CREW

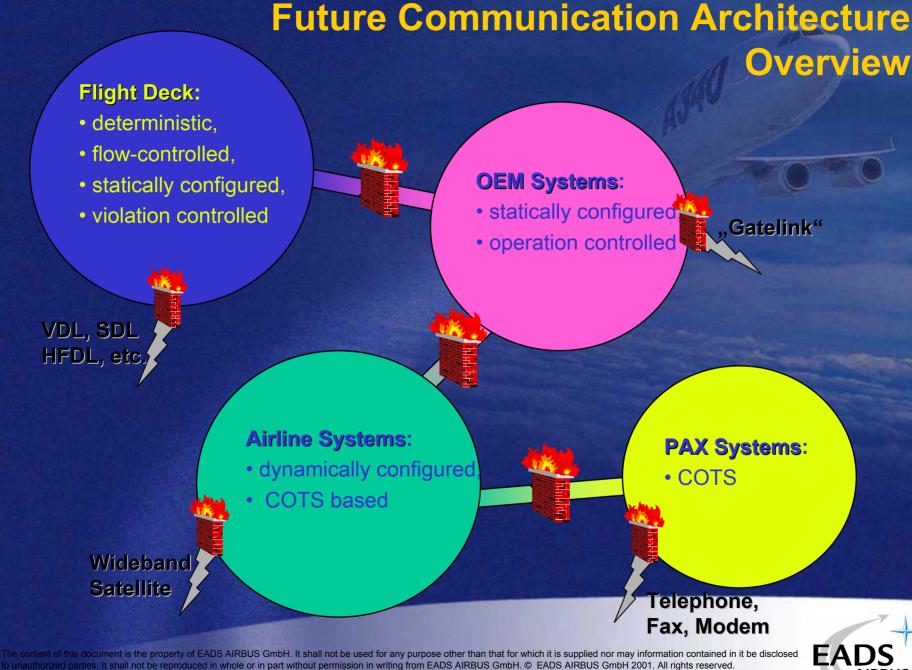
10 - 64 Kbs

64 - 256 Kbs

432 - 800 Kbs

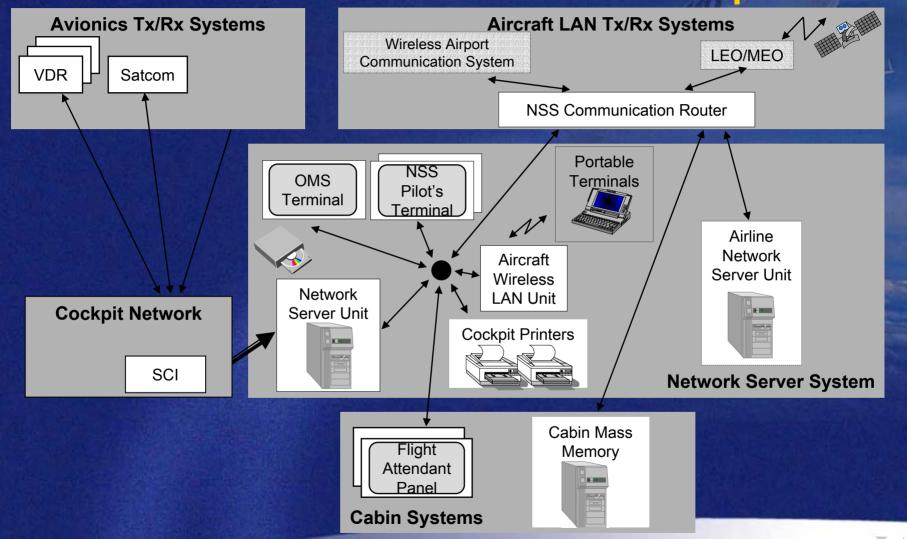
Digital Logbook





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Future Communication Architecture Example: A380





Future Communication Architecure Additional Services

ATC en-route, TMA, Tower

ATC Strategic

4D Constraints

Clearances (DC, Taxi, Take-off, SID/route/STAR. App, Ldg, Oceanic, ...) Readback

Request Negotiation Acknowledgement Position Report. (ADS)

ATC tactical

Alerts

Instructions (Hdg, Speed, Alt, Frequency, Taxi, ...) Traffic Information

Emergency Safety

Acknowledgement

AOC/AAC

e.g.

Perfo Factors Flight plan Slot data

Weather Info Info request Reports

Airline Operations

Flight Information

ATIS NOTAM Wind/Temp TAF/METAR

Surf Obs Wind aloft **PIRFPs**

MET/AIS center



Communication Technologies Overview

Current Communication Protocols:

- ACARS
- Early ATN Implementations

Future Communication Protocols:

- Full ATN (OSI-Based)
- TCP/IP (Internet-Based)

Current Communication Media:

- VHF, HF and Satcom (Inmarsat-Based)
- **Future Communication Media:**
 - Satellites, various Frequencies and Bandwidth



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Communication Technologies Research Needs

Future Communication Protocols:

Optimize TCP/IP for Aeronautical Needs

Current Communication Media:

Enhance VHF, HF for higher Bandwidth

Future Satellites:

- Global Airline Networks Need Global Coverage
- Advanced Applications Need Very High Bandwidth
- Short Time-to-Market Need Robust Int'l Standards

